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RECORDING AND REPRODUCING DEVICE AND PROGRAM LIST  
FORMING METHOD THEREOF

FIELD OF THE INVENTION

5 The present invention relates to a recording and reproducing device with  
program list of program information having viewing restrictions and program list  
forming method thereof.

BACKGROUND OF THE INVENTION

10 In JP Utility Model Publication No.H06-052025 a method is disclosed for  
preventing another user from obtaining access of recorded contents easily. A user  
records the desired contents with a password. The recorded contents are then  
converted to pseudo random data in accordance with each password. During  
reproduction, a reverse process is performed in correspondence with the  
password.

15 JP Patent Publication No.H08-007475 discloses a method where a user is  
requested to input a password to prevent another user from reproducing the  
recorded contents freely. Reproduction from a recording medium is controlled  
based on the result of a comparison of the inputted password with a registered  
one.

20 In the prior art, though normal reproduction is impossible without a valid  
password, another user can reproduce and delete the recorded contents, or easily  
obtain information regarding the recorded programs (for example, title, day and  
time, length, etc. of the programs), when plural users share the recording and  
reproducing device having the list of the recorded contents. Therefore, even if  
the device has a password input function, the privacy issue is not resolved as long  
25 as the recorded contents are indicated on a display.

SUMMARY OF THE INVENTION

In a recording and reproducing device having a program list recording part  
to record program information which comprises control input means to input a

password, password managing part to manage the password, and program list forming means to read from the program list recording part and to form program list, the program list recording part includes the first program list recording part whose information is indicated only by inputting a valid password which matches  
5 the password managed in password managing part and the second program list recording part whose information is indicated when a user does not input a password or when an inputted password is wrong.

### BRIEF DESCRIPTION OF THE DRAWINGS

10 Fig. 1 is a block diagram of a recording and reproducing device in accordance with a first exemplary embodiment of the present invention.

Fig. 2 is a block diagram of a recording and reproducing device in accordance with a second exemplary embodiment of the present invention.

Fig. 3 is a block diagram of a recording and reproducing device in accordance with a third exemplary embodiment of the present invention.

### 15 DETAILED DESCRIPTION OF THE INVENTION

(First Embodiment)

A first exemplary embodiment of the present invention is demonstrated hereinafter with reference to Fig.1.

20 Recording audio and visual signals (hereinafter called an AV signal) related to television broadcasting is described in Fig. 1. An AV signal of analog style is applied to terminal 10 and is compressed at compression record part 102 after digitalization. This compressed AV signal is sent to recording medium 103, and then recorded there. If an inputted signal is already digital style, it is just compressed and recorded at recording medium 103.

25 When reproducing, the compressed data from recording medium 103 is sent to extension reproduction part 104. After the AV signal is extended and converted to an analog stylesignal, it is output from output terminal 11 to an

outside display unit like a television monitor (not shown in Fig.1).

Control input means 100 transmits a control signal to user interface part (hereinafter called user I / F part) 101 in order to control a recording and reproducing device. Usually, control input means 100 is a remote control device (hereinafter called a remote controller. A keyboard, a mouse, etc. can also be utilized. A user utilizes a transmission channel which is cabled, wireless, light, etc. in order to control a recording and reproducing device. In other words, user I/F part 101 processes a control signal transmitted from an outside device like a remote controller, and controls the interface between the outside device and a recording and reproducing device. A control input part other than a remote controller may be built into the main body of a recording and reproducing device

Now, a recording mode of program information is described here. There are two kinds of recording modes as follows. A user predetermines whether program information is to be recorded in the first program list recording part or the second program list recording part by control input means 100. He/She may choose such recording mode after inputting password. Once a password is inputted to user I/F part 101 by control input means 100, it is compared with the registered password in password managing part 105. Only if the inputted password matches with the registered one (namely, it is a valid password), the program information is recorded into the first program list recording part 111 (hereinafter called the first recording mode). Then, if a user does not input a password or the inputted password is wrong (namely it is an invalid password), the program information is recorded into the second program list recording part 112 (hereinafter called the second recording mode). Further, each program list recording part 111 and 112 has two recording areas; one is for reservations and the other is for recording. That is to say, a reservation list recording part 107 and private reservation list recording part 109 are for a reservation area, and recorded list recording part 108 and private recorded list recording part 110 are for a recorded area. Here, "private" means it is not indicated without a valid password.

Then, the indication mode of indicating the program list is described here. The alternative of the following three modes; the first indication mode, the second indication mode, the third indication mode can be set by control input

means 100. In case of a valid password, two indication modes are provided. As for the first indication mode, a program list read from only the program list recording part 111 is formed at program list forming part 106. Then, the requested program list can be displayed on an outside TV monitor, etc.

- 5 Regarding the second indication mode, a program list read from both recording part 111 and recording part 112 is formed at program list forming part 106, and then displayed.

- 10 In case of an invalid password, a program list read from only the program list recording part 112 is formed at program list forming part 106. Then, the requested program list can be displayed. This is the third indication mode.

- 15 Thus, when a user makes a recording reservation on the second recording mode by control input means 100, reserved program information including title, time, length, etc. of the program is recorded in reservation list recording part 107. And recorded program information is recorded in recorded list recording part 108.

- 20 Otherwise, when a user makes a recording reservation on the first recording mode by control input means 100, reserved program information is recorded in private reservation list recording part 109. And recorded program information is recorded in private recorded list recording part 110. Here, in both the first and second indication modes, a valid password inputted by a user enables him/her to see a program list formed at program list forming part 106, that is read from private reservation list recording part 109 and private recorded list recording part 110.

- 25 As described above, after setting the first recording mode by control input means 100, a user can record a desired program information in the first program list recording part 111 that cannot be shown with an invalid password. This means that each user can easily set viewing restriction and that privacy can be protected. Therefore, the problem of reproducing and deleting program by another user is resolved successfully.

- 30 (The Second Embodiment)

The second exemplary embodiment of the present invention is demonstrated hereinafter with reference to Fig.2. Regarding the same constitution and operation presented in the first embodiment, a detailed explanation is omitted and the same numbers as in Fig.1 are used. The differences between the two embodiments are described below.

In Fig.2, there are differences points from the first embodiment. One difference is the addition of V-chip detecting part 209. Another difference is deleting the distinction between the reservation list and the recorded list in the first program list recording part 111, which means recording part 111 consists of only a private program list recording part. However, the second program list recording part 112 comprises both reservation part 107 and recorded part 108 as in first embodiment.

In the V-chip system, ratings such as "violent" and "sexual" are respectively given to television programs, and the program to be broadcast accompanied by the rating information is sent out. Regarding the television broadcasting program having a V-chip system, a V-chip signal is incorporated into a vertical blanking interval of a video signal. The type of rating is defined by EIA (Electronic Industries Association) 744.

A V-chip signal is a viewing restriction which can be placed on a program, so that parents can choose to filter what their children see in order to protect children from violent or adult programs with harmful effects. As to V-chip information indicated in EIA-744-A, several categories of viewing restrictions are as follows; what is appropriate for all children, what is designed for children age 7 and above, what is suitable for all ages, what is inappropriate for children under 14, what is unsuitable for children under 17, and so on.

First a reservation operation is described. In making a reservation, a user begins by setting a recording mode and a rating level by control input means 100. When a user chooses the first recording mode, program information is recorded in the first recording part 111, which is private. In order to indicate the program list, a password is requested. Then, a user chooses the second recording mode, and program information is recorded in the reservation list recording part 107. He/she is not requested to input a password to watch the program list. However,

reproducing program contents is controlled depending on the rating level in the V-chip signal that he/she has set as the reservation operation.

Second, the case of the first recording mode is described here. Television broadcasting program information is recorded in the first program list recording part 111, which is private. The recorded program information in this private recording part 111 can be indicated when a user inputs a valid password managed in password managing part 105 by control input means 100. Then, the desired recorded contents can be reproduced. Namely, other users can neither reproduce the recorded program nor delete it, as they do not know the valid password. This means it is easy to set the viewing restriction to protect each privacy.

Last, the case of the second recording mode is described here. Television broadcasting program information is recorded in the second program list recording part 112. In making a reservation, program information is recorded in reservation list recording part 107. Such a recorded program list can be indicated as being free from a password. After being recorded, however, in order to reproduce the recorded contents in a recording medium, the reproduction operation is controlled in accordance with the rating level of a V-chip signal that has been set as the reservation operation by control input means 100. When the V-chip signal of the desired program is detected to be stricter than the predetermined rating level, the reproduction operation is restricted. That is to say, the desired contents cannot be reproduced.

In the second recording mode, when the rating level of the desired program is stricter than the predetermined level, the program information can be changed so that it is recorded in the private program list recording part 111. However, even in the first recording mode, as long as the rating level of the desired program is not stricter than the predetermined level, a user can make a change so that the desired program is recorded in the second recording part 108. Namely, it is possible to arrange the program list that is according to rating level. In other words, in the second recording mode, program information can be controlled so that it is recorded in the first recording part 111 or the second recording part 108 in accordance with the rating level detected in the V-chip signal.

This embodiment has been described with reference to television broadcasting. However, a similar effect can also be obtained in a package media such as DVD soft and VTR soft with a viewing restriction on. Thus, privacy can be protected.

## 5 (The Third Embodiment)

The third exemplary embodiment of the present invention is described hereinafter with reference to Fig.3. Regarding the same constitution and operation as the invention presented in the first embodiment, a detailed explanation is omitted and the same numbers as Fig.1 are used. The differences  
10 between the two embodiments are described below.

In Fig.3, there are two differences from the first embodiment. One difference is the addition of recording medium dividing part 308 that is managing the record area in the recording medium. The other difference is the division of recording medium 103 into a recording area and preparing program list recording  
15 part 307 that has both a recorded program list and a recording reservation list corresponding with each divided record area, and still, passwords corresponding with each divided area are set. When a user wants to watch the recorded program information in recording part 307 including a recorded list and a reservation list in each area, he/she inputs a valid password corresponding with each area that is  
20 managed at password managing part 105. Then, a corresponding list of the desired program information is formed at program list forming part 106 and displayed on TV monitor, etc. as he/she can watch.

Recording medium dividing part 308 divides the recording medium 103 into an arbitrary number of record areas by way of user I/F by user's setting at  
25 control input means 100. A user can change settings regarding number and capacity of dividing area at this dividing part 308. In accordance with division at dividing part 308, recorded program list 1~N and recording reservation list 1~N that are corresponding with the number of divided record area are prepared. Each recording area has a corresponding list respectively. Program information  
30 is recorded in only the corresponding record area. A user can choose the desired one among recorded program list 1~N and recording reservation list 1~N by inputting password managed at password managing part 105 by way of control

input means 100. In reproducing, the program list is read from the recording area in recording medium 103 corresponding with input valid password and formed at the program list forming part 106. As the result, a chosen program list can be indicated and the desired contents can be reproduced.

- 5           As written above, by dividing recording medium 103 into plural areas and having each list in every divided area, the problem of reproducing and deleting program by another user is successfully solved. Thus, privacy can be protected.

- Further, at control input means 100, it is possible to set a password free area in dividing recording medium 103 into an arbitrary number of record area.  
10       A password free area means accessible record area without password. In such a password free area, anyone can see the program list and reproduce desired contents.

- Although the present invention has been described in terms of various embodiments, it is not intended that the invention be limited to these  
15       embodiments. Modifications within the spirit of the invention will be apparent to those skilled in the art.